

IN THE CLAIMS:

1. (original) A method for broken empty egg shells and liberating the membrane and mineral fractions thereof from attachment to one another, comprising the steps of:

supplying a raw input stream of substantially empty broken egg shells, inclusive of a water content, inherently some of which is presumptively contained in the gas-exchange pores of the egg shells that extend through both the membrane and mineral layers thereof;

providing a main processor that operates at a level of vacuum whereby said vacuum level determines a given boiling temperature for water that is lower than water's boiling temperature at relatively elevated pressures;

pre-heating the raw input stream at a pressure above the main processor's vacuum level in order to elevate the bulk temperature to above said given boiling temperature for water as determined by said main processor's vacuum level without, however, boiling water in the raw input stream by said pre-heating thereof;

introducing the pre-heated raw input stream into the main processor through a pressure isolation device in order to preserve the main processor's vacuum level whereby a small percentage of the water content in the pre-heated raw input material flashes into steam, this presumptively promoting flakes of the membrane fraction to eject or detach from attached or adhered shards or powder of the mineral fraction.

2. (original) The method of claim 1 further comprising providing the main processor with a throughput of a hot pneumatic carrier for syphoning up and suspending suspension particles from out of the detaching membrane and mineral fractions.

3. (original) The method of claim 2 further comprising a vacuum source connected to a vacuum port in the main processor to suction out a pneumatic stream comprising the pneumatic carrier, vapors, and suspension particles.

4. (original) The method of claim 3 further comprising a separation process between the vacuum source and the vacuum port of the main processor to separate the pneumatic stream into one component or set of components and another component or set of components, wherein said one component or set of components comprises substantially particle matter including liberated shards or powder of the mineral fraction and/or liberated membrane petals as said other component or set of components comprises variously the pneumatic carrier, vapors and perhaps ultra-fine particulate matter as dried albumen dust.

5-8. (canceled)

9. (original) A method of dividing empty broken egg shells into membrane and mineral outputs respectively, comprising the steps of:

supplying a raw input stream of substantially empty broken egg shells, inclusive of a water content, inherently some of which is presumptively contained in the gas-exchange pores of the egg shells that extend through both the membrane and mineral layers thereof;

providing a main processor with an inlet stream of a hot pneumatic carrier as well as a connection to a vacuum source that is constantly counteracting among other inputs the inlet of the hot pneumatic carrier in order to pull a level of vacuum within the main processor, whereby said main processor's vacuum level determines a given boiling temperature for water that is lower than water's boiling temperature at relatively elevated pressures;

pre-heating the raw input stream at a pressure above the main processor's vacuum level in order to elevate the bulk temperature to above said given boiling temperature for water that is determined by the main processor's vacuum level without, however, boiling water in the raw input stream by way of said pre-heating;

introducing the pre-heated raw input stream into the main processor through a pressure isolation device in order to preserve the main processor's vacuum level;

allowing the introduced pre-heated raw input material to mix with the hot pneumatic carrier, whereby a small percentage of the water content in the pre-heated raw input material flashes into steam and this presumptively promoting flakes of the membrane fraction to eject or

detach from attached or adhered shards or powder of the mineral fraction, as well as allowing the hot pneumatic carrier to syphon up and/or suspend suspension particles from out of detaching membrane and mineral fractions;

the vacuum source connected to a vacuum port in the main processor to suction out a pneumatic stream comprising the pneumatic carrier, vapors, and suspension particles;

interposing a separation process between the vacuum source and the vacuum port of the main processor to separate the pneumatic stream into one component or set of components and another component or set of components, wherein said one component or set of components comprises substantially a particle stream including liberated shards or powder of the mineral fraction and/or liberated membrane petals, as said other component or set of components comprises variously the pneumatic carrier, vapors and perhaps ultra-fine particulate matter as dried albumen dust.

10-11. (canceled)

12. (original) The method of claim 9 wherein the main processor comprises a multi-sectioned tubular vessel arranged horizontally and extending between an introduction end and a discharge end as well as housing a mechanical agitator which comprises an internal auger that comparably extends end to end inside the vessel;

said vessel's sections including a tight-fitting duct section originating at the introduction end and which is characterized as surrounding the auger such that the auger's outer periphery virtually scrapes the vessel's wall in this tight-fitting duct section, and wherein said tight-fitting duct section changes into a flaring section that in turn changes into an over-sized duct section that terminates at the discharge end.

13. (original) The method of claim 12 wherein all three sections are arranged to rest flat on a common base elevation such that the internal auger is situated on the bottommost elevation in not just the tight-fitting duct section but also the flaring and over-sized duct sections, whereby the flaring and over-sized duct sections form a relative trough for the internal auger.

14. (original) The method of claim 12 wherein the vacuum port for the main processor is disposed in discharge end and/or over-sized duct section at an elevation above the auger.

15-21. (canceled)

22. (original) The method of claim 9 wherein the separation process interposed between the vacuum source and the main processor includes a cyclone separator, which comprises a vent for exhausting the other component or set of components to the vacuum source as well as a drain for the one component or set of components which thereafter transit through a pressure isolation device to preserve the level of vacuum inside the cyclone separator.

23. (canceled)

24. (original) A method for detaching apart the membrane and mineral fractions of empty broken egg shells comprising the steps of:

supplying empty broken egg shells, inclusive of a water content, inherently some of which is presumptively contained in the gas-exchange pores of the egg shells that extend through both the membrane and mineral layers thereof;

providing a main processor that operates at a level of vacuum;

at a relatively elevated pressure, pre-heating the empty broken egg shells in order to elevate the bulk temperature to above what corresponds to the boiling temperature for water within the main processor's vacuum level; and

introducing the pre-heated empty broken egg shells into the main processor whereby a small percentage of the water content flashes into steam, this presumptively promoting the membrane fraction to eject or detach from attached or adhered shards or powder of the mineral fraction.

25. (original) The method of claim 24 further comprising providing the main processor with a throughput of a hot pneumatic carrier for syphoning up and suspending suspension particles from out of the detaching membrane and mineral fractions.

26. (original) The method of claim 25 further comprising a vacuum source connected to a vacuum port in the main processor to suction out a pneumatic stream comprising the pneumatic carrier, vapors, and suspension particles.

27. (original) The method of claim 26 further comprising a separation process between the vacuum source and the vacuum port of the main processor to separate the pneumatic stream into one set of components comprising substantially particle matter including substantially both liberated membrane petals and else shards or powder of the mineral fraction as well as into another set of components comprising variously the pneumatic carrier, vapors and perhaps ultra-fine particulate matter as dried albumen dust.

28-30. (canceled)

31. (new) A method of processing broken empty eggshells to liberate shell membrane from shell mineral, comprising the steps of:

introducing empty broken eggshells from a higher pressure environment to a lower pressure environment, causing shell membrane to liberate from shell mineral.

32. (new) The method of claim 31 further comprising:

suctioning a current of carrier gas through the lower pressure environment, which enhances causing the empty broken egg shells to disintegrate into fractions comprising gasified fractions, finely-divided particulate suspended fractions, and other suspended fractions characterized by membrane petals and shreds, and as well as other heavy fractions when applicable.

33. (new) The method of claim 32 further comprising suctioning the lower pressure environment to a suction source, creating a suction stream comprising the carrier gas, vapors, and waftable fractions.

34. (new) The method of claim 33 further comprising a separation process between the suction source and lower pressure environment to separate the pneumatic stream into one component or set of components and another component or set of components, wherein said one component or set of components comprises substantially particle matter including liberated membrane petals or shreds as said other component or set of components comprises variously the pneumatic carrier, vapors and perhaps ultra-fine particulate matter as dried albumen dust.

35. (new) The method of claim 32 wherein the current of carrier gas is pre-heated.

36. (new) The method of claim 32 further comprising heating the lower pressure environment such that the empty broken eggshells are introduced into a heated lower pressure environment.

37. (new) The method of claim 36 further comprising heating the higher pressure environment such that the empty broken eggshells are introduced from a heated higher pressure environment.

38. (new) The method of claim 32 further comprising heating the higher pressure environment such that the empty broken eggshells are introduced from a heated higher pressure environment.

39. (new) The method of claim 31 further comprising suctioning a hot pneumatic carrier through the lower pressure environment for syphoning up and suspending liberated shell membrane petals and shreds.

40. (new) The method of claim 31 further comprising heating the lower pressure environment such that the empty broken eggshells are introduced into a heated lower pressure environment.

41. (new) Eggshell membrane petals liberated from shell mineral in accordance with the method of claim 31.

42. (new) Eggshell membrane product liberated from eggshell mineral in accordance with the method of claim 31.

43. (new) Eggshell membrane product liberated from eggshell mineral in accordance with the method of claim 24.

44. (new) Eggshell membrane product liberated from eggshell mineral in accordance with the method of claim 5.

45. (new) Eggshell membrane product liberated from eggshell mineral in accordance with the method of claim 1.